

Article 34

CLAIMS:

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1. An electric network comprising
at least one fiber comprising a nucleotide chain defining the
network's geometry; and
one or more substances, molecules, clusters of atoms or molecules
or particles bound thereto or complexed therewith to form at least
one electric or electronic component or a conductor;
the network being electrically connected to an electrically conducting interface
10 component for electric communication with an external electric component or
circuitry.

2. A network according to Claim 1, wherein at least one of the network
components is a wire.

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3. A network according to Claim 1 ~~or 2~~, comprising at least two fibers
15 connected to one another at a junction in which one nucleotide segment of one
fiber is bound to another nucleotide segment of another fiber by a
sequence-specific interaction.

4. A network according to ~~any one of~~ Claims 1-3, comprising a junction
between a nucleotide chain of one fiber and a nucleotide chain of another fiber,
20 formed by a molecule, cluster of atoms or molecules or a particle bound to each
of the nucleotide chains.

5. A network according to ~~any one of~~ Claims 1-4, comprising an entity being
a molecule, cluster of atoms or molecules or a particle, which entity changes
from an electrically conducting to an electrically non-conducting state by transfer
25 of electrons to or from said entity.

6. A network according to ~~any one of~~ Claims 1-5, comprising nucleotides
which have been chemically modified by attaching thereto a substance molecule,
cluster of atoms or molecules or particles.

uncl 7. A network according to Claim 6, wherein the chemically modified nucleotides are included in the network:

- (i) in junction between fibers for binding the fibers to one another,
- (ii) in junction between a fiber and a linker that binds a fiber to an electronic component of the network, or
- (iii) in junction between a fiber or an electronic component and an interface component.

8. A network according to Claim 6 or 7, wherein the chemically modified nucleotide carries one member of a binding couple for binding to another component comprising the other member of the binding couple.

10. A network according to ~~any one of Claims 6-8~~, wherein the chemically modified nucleotide carries a thiol, amine residue, an active ester or a carboxyl group.

10. A network according to ~~any one of Claims 1-9~~, having

- (a) at least one conductor being a wire constructed on a fiber comprising at least one nucleic acid chain;
- (b) at least one electronic component being electrically connected to said at least one wire and being constructed either on a nucleic acid chain which has been chemically or physically modified by depositing one or more molecules, cluster of atoms or molecules or particles thereon, or being constructed by a molecule, cluster of atoms or molecules or a particle situated at a junction between two or more nucleic acid chains of different fibers.

20 11. A network according to ~~any one of Claims 1-10~~, comprising two or more fibers assembled to form the network on the basis of sequence-specific interaction of nucleic acid chains.

25 12. A network according to ~~any one of Claims 1-11~~, wherein at least one nucleic acid chain is formed into an electric or electronic component by sequence or

domain-specific binding thereto of said substances, molecules, clusters of atoms or molecules or particles.

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13. A network according to ~~any one of Claims 1-12~~, wherein at least one nucleic acid chain is made electrically conductive by substances comprising a metal bound to the chain or portion thereof.

14. A network according to ~~any one of Claims 1-13~~, wherein the network comprises at least one wire formed by non-metallic conducting substance bound to a fiber or portion thereof.

15. A network according to ~~any one of Claims 1-14~~, wherein at least one fiber has at least a portion bound to semi-conducting substances.

16. A network according to Claim 15, wherein the at least a portion, is a sequence within a nucleotide chain.

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17. A network according to ~~any one of Claims 1-16~~, wherein one of two adjacent portions of at least one fiber are bound to a p-type semi-conducting substance and the other to an n-type semi-conducting substance, whereby the two adjacent portions of the fiber constitute a p/n junction.

18. A network according to Claim 17, wherein at least one of the two adjacent portions is a segment of a nucleotide chain.

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19. A network according to ~~any one of Claims 1-18~~, comprising at least one nucleotide-based junction formed by hybridization of complementary sequences of nucleotide chains in at least two fibers.

20. A network according to Claim 19, wherein said junction is formed into bipolar transistors, comprising:

(a) a p-type semi-conducting substance bound to a first nucleotide segment at the junction and an n-type semi-conducting substance bound to adjacent, second nucleotide segments at both sides of the first nucleotide segment, or

(b) an n-type semi-conducting substance bound to a first nucleotide segment at the junction and a p-type semi-conducting substance

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bound to adjacent, second nucleotide segments at both sides of the first nucleotide segment.

21. A network according to any one of Claims 1-20, comprising at least one input/output interface component connected to at least one network component in a manner allowing electric conductivity between said interface component and said network component.

22. A network according to Claim 21, comprising at least two interface components, each one connected to at least one fiber or electronic component of the network.

23. A network according to Claim 21 ~~or 22~~, wherein said interface component is connected to a wire, said wire comprising a fiber having one or more nucleotide chains.

24. A network according to Claim 23, wherein the fiber has a nucleotide end segment, and is bound to the interface component by a specific interaction with a complexing agent bound to a linker attached to the interface component.

25. A network according to Claim 24, wherein the linker comprises a nucleotide chain, and said nucleotide end segment is bound thereto by sequence-specific interaction.

26. A network according to Claim 21 ~~or 22~~, wherein said interface component is bound to a nucleotide chain that is bound to an electronic component of the network.

27. An electronic circuit comprising a network according to any one of Claims 1-22.

28. A method for making an electronic network, comprising:

(a) providing an arrangement comprising at least one electrically conductive interface component;

(b) attaching a linker to the at least one interface component;

(c) contacting said arrangement with at least one fiber comprising at least one nucleotide chain with a sequence capable of binding to the linker, and permitting binding of said sequences to said linker, electrically or electronically functionalizing the at least one nucleotide chain by depositing thereon or complexing thereto at least one substance or particles.

5 (d)

29. A method according to Claim 28, wherein the network is formed by self-assembly as a result of chemical complementary and molecular recognition properties of at least one nucleotide chain to at least one other nucleotide chain or 10 between at least one nucleotide chain and at least one specific sequence or domain-recognizing complexing agent.

30. A method according to Claim 28 ~~or 29~~, comprising mixing fibers and components together and allowing them to self-assemble into a network by means of specific molecule interactions.

15 31. A method according to ~~any one of~~ Claims 28-30, comprising forming junctions between nucleotide chains and at least one molecule, cluster of atoms or molecules or particles, said molecule clusters or particles serving as an electronic component in the network.

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